Worcestershire Acute Hospitals NHS Trust

APLS cardiorespiratory arrest

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Key Documents Owner:	Dr Shinwari	Consultant Paediatrician
Approved by:	Paediatric Quality Improvement meeting	
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Key Amendments

Date	Amendment	Approved by
9th February 2024	Added flowchart from PiP	Paediatric QIM

The following guidance is taken from the Partners In Paediatrics (PIP)

APLS – CARDIORESPIRATORY ARREST

MANAGEMENT

- Stimulate patient to assess for signs of life and call for help
- Establish basic life support: Airway – Breathing – Circulation
- Connect ECG monitor: identify rhythm and follow **Algorithm**
- Control airway and ventilation: preferably intubate
- Obtain vascular access, peripheral or intraosseous (IO)
- Change person performing chest compressions every few minutes

Airway (A)

- Inspect mouth: apply suction if necessary
- Use either head tilt and chin lift or jaw thrust
- Oro- or nasopharyngeal airway
- Intubation [see **Aide memoire** (**APLS Recognition and assessment of the sick child** guideline)]
- If airway cannot be achieved, consider laryngeal mask or, failing that, cricothyrotomy

Breathing (B)

- Self-inflating bag and mask with 100% oxygen
- Ventilation rate
- unintubated: 2 inflations for every 15 compressions
- intubated: 10–12/min, with continuous compressions
- Consider foreign body or pneumothorax

Circulation (C)

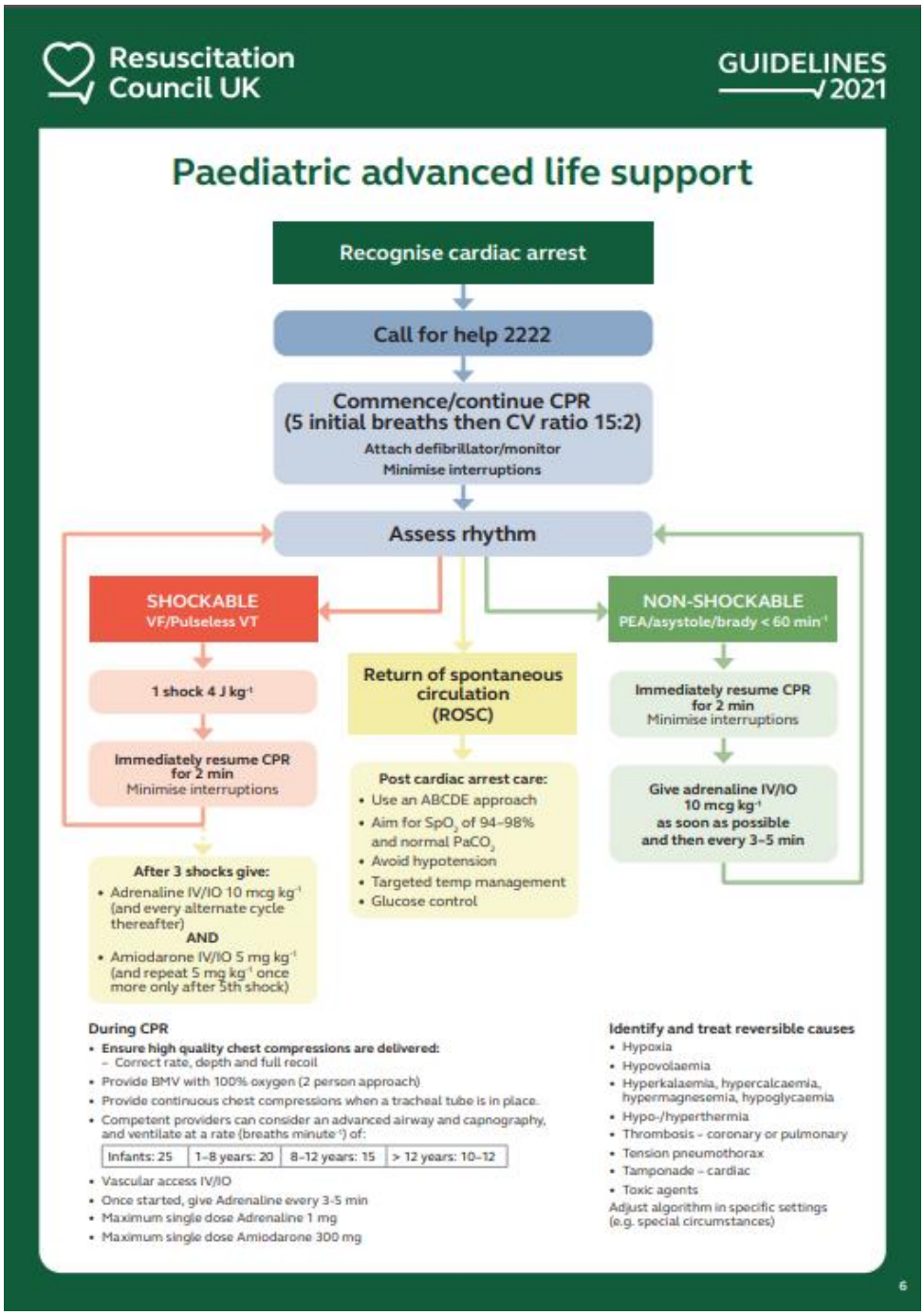
- Cardiac compression rate: 100–120/min depressing lower half of sternum by at least one third (4 cm infant, 5 cm child, 6 cm adult): push hard, push fast
- Peripheral venous access: 1–2 attempts (<30 sec)
- IO access: 2–3 cm below tibial tuberosity (see **Intraosseous infusion** guideline)
- Use ECG monitor to decide between:
- a non-shockable rhythm: asystole or pulseless electrical activity (PEA) **OR**
- a shockable rhythm: ventricular fibrillation or pulseless ventricular tachycardia

Algorithm for managing these rhythms follows:

- If arrest rhythm changes, restart **Algorithm**
- If organised electrical activity seen, check pulse and for signs of circulation

Adrenaline doses for asystole

Route	Aged <12 yr	Aged 12 yr–adult	Notes	
IV rapid bolus/ IO	10 microgram/kg (0.1 mL/kg of 1:10,000)	1 mg (10 mL of 1:10,000 **OR** 1 mL of 1:1000)	Initial and usual subsequent dose	If given by IO route flush with sodium chloride 0.9%


Resuscitation Council UK
GUIDELINES 2021
Paediatric advanced life support
Recognise cardiac arrest
Call for help 2222
Commence/continue CPR (5 initial breaths then CV ratio 15:2)
Attach defibrillator/monitor
Minimise interruptions
Assess rhythm
SHOCKABLE
VF/Pulseless VT
1 shock 4 J kg-1
Immediately resume CPR for 2 min
Minimise interruptions
After 3 shocks give:
• Adrenaline IV/IO 10 mcg kg-1 (and every alternate cycle thereafter)
AND
• Amiodarone IV/IO 5 mg kg-1 (and repeat 5 mg kg-1 once more only after 5th shock)
Return of spontaneous circulation (ROSC)
Post cardiac arrest care:
• Use an ABCDE approach
• Aim for SpO2 of 94–98% and normal PaCO2
• Avoid hypotension
• Targeted temp management
• Glucose control
NON-SHOCKABLE
PEA/asystole/brady < 60 min-1
Immediately resume CPR for 2 min
Minimise interruptions
Give adrenaline IV/IO 10 mcg kg-1 as soon as possible and then every 3–5 min
During CPR
• Ensure high quality chest compressions are delivered:
– Correct rate, depth and full recoil
• Provide BMV with 100% oxygen (2 person approach)
• Provide continuous chest compressions when a tracheal tube is in place.
• Competent providers can consider an advanced airway and capnography, and ventilate at a rate (breaths minute-1) of:
Infants: 25 | 1–8 years: 20 | 8–12 years: 15 | > 12 years: 10–12
• Vascular access IV/IO
• Once started, give Adrenaline every 3-5 min
• Maximum single dose Adrenaline 1 mg
• Maximum single dose Amiodarone 300 mg
Identify and treat reversible causes
• Hypoxia
• Hypovolaemia
• Hyperkalaemia, hypercalcaemia, hypermagnesemia, hypoglycaemia
• Hypo-/hyperthermia
• Thrombosis – coronary or pulmonary
• Tension pneumothorax
• Tamponade – cardiac
• Toxic agents
Adjust algorithm in specific settings (e.g. special circumstances)
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Defibrillation

- Use hands-free paediatric pads in children, may be used anteriorly and posteriorly
- Resume 2 min of cardiac compressions immediately after giving DC shock, without checking monitor or feeling for pulse
- Briefly check monitor for rhythm before next shock: if rhythm changed, check pulse
- Adrenaline and amiodarone are given after the 3rd and 5th DC shock, and then adrenaline only every other DC shock
- Automatic external defibrillators (AEDs) do not easily detect tachyarrhythmias in infants but may be used at all ages, ideally with paediatric pads, which attenuate the dose to 50–80 J

PARENTAL PRESENCE

- Evidence suggests that presence at their child's side during resuscitation enables parents to gain a realistic understanding of efforts made to save their child. They may subsequently show less anxiety and depression
- Designate 1 staff member to support parents and explain all actions
- Team leader, not parents, must decide when it is appropriate to stop resuscitation

WHEN TO STOP RESUSCITATION

- No time limit is given to duration of CPR
- no predictors sufficiently robust to indicate when attempts no longer appropriate
- cases should be managed on individual basis dependent on circumstances

Prolonged resuscitation has been successful in:
hypothermia (<32°C)
overdoses of cerebral depressant drugs (e.g. intact neurology after 24 hr CPR)
Discuss difficult cases with consultant before abandoning resuscitation

POST-RESUSCITATION MANAGEMENT

Identify and treat underlying cause

Monitor

- Heart rate and rhythm
- Oxygen saturation
- CO_2 monitoring
- Core and skin temperatures
- BP
- Urine output
- Arterial blood gases and lactate
- Central venous pressure

Request

- CXR
- Arterial and central venous gases
- Haemoglobin and platelets
- Group and save serum for crossmatch
- Sodium, potassium, U&E
- Clotting screen
- Blood glucose
- LFTs
- 12-lead ECG
- Transfer to PICU
- Hold team debriefing session to reflect on practice